

REMARKS

Claims 1-16 are pending in the application. Claims 1, 9 and 14 have been amended by the present amendment. The amendments are fully supported by the application as originally filed.

Applicants' claimed invention is directed to a substrate strip including: a frame having a pair of parallel supporting bars, and at least one substrate. The substrate is linked to the supporting bars by no more than two tie bars, wherein at least one tie bar is arranged on a corner of the substrate (see claim 1). In the case of using just two tie bars, the two tie bars can be arranged on two adjacent corners of the substrate (see FIG. 2A), or on diagonally opposite corners of the substrate (see FIG. 3A). Alternatively, one of the tie bars can be arranged on one corner of the substrate, and the other tie bar can be arranged on one side of the substrate (see FIG. 4A).

As amended, claim 1 recites that at least one external tie bar is arranged on a corner of the substrate. Similarly, claim 9 requires at least one tie bar to be arranged on a corner of the substrate. Claim 14 recites an external one-point linkage structure consisting of just one tie bar arranged on a corner of the substrate. Support is provided in the specification, e.g., at page 6, lines 4-8; page 7, lines 1-5; page 7, lines 21-25; and page 8, lines 16-18.

The above-described substrate strip can provide significant benefits. By using no more than two tie bars to connect the substrate to the supporting bars, at least two corners of the substrate are not connected to the tie bars. During high-temperature fabrication processes, when the substrate is subjected to thermal stresses, the substrate can freely expand toward the corners not connected to tie bars, and thus the thermal stresses can be released. Consequently, the thermal stresses would not concentrate toward the center of the substrate, thereby preventing the substrate from becoming warped (see, e.g., specification at page 6, lines 9-20).

Claims 1-3, 9, and 10 were rejected under 35 USC 102(b) as being anticipated by U.S. Patent 5,925,934 to Lim. Claims 4, 5, 11, and 12 were rejected under 35 USC 103(a) as being unpatentable over Lim. Claims 6, 7, and 13-16 were rejected under 35 USC 103(a) as being unpatentable over Lim in view of U.S. Patent 5,847,446 to Park et al. (hereinafter "Park"). Claim 8 was rejected under 35 USC 103(a) as being unpatentable over Lim in view of Park, and further in view of "admitted prior art." These rejections are respectfully traversed.

Lim does not teach or suggest a substrate which is linked to supporting bars by means of no more than two external tie bars, where at least one external tie bar is arranged on a corner of the substrate.

Lim is directed to a chip-sized package (CSP), e.g., as shown in FIGS. 10A and 11, including a chip 505 with an array of chip ports (chip interconnect bumps 520) on an active surface 510 of the chip 505. The chip 505 is held in a cavity 575 of a frame 570 by a pair of frame tie bars 530, as shown in FIG. 11 (see column 6, lines 27-28).

However, Lim does not teach or suggest a **substrate** connected to supporting bars by no more than two tie bars. Instead, Lim teaches holding the chip 505 on top of the tie bars 530 when the chip 505 is mounted to the frame 570 (see FIG. 11), so as to yield a package size equal to that of the chip 505 due to the absence of a substrate (see column 4, lines 25-31). As stated in column 4, lines 26-27, "the substrate and other intermediate processes are eliminated."

In the Office Action, it was alleged that Lim teaches "at least one substrate (505 chip includes a substrate)" (see page 2, middle of page). However, the above passages of Lim contradict this statement. Instead, Lim is specifically directed to a CSP in which the substrate is eliminated (see column 4, lines 26-27).

Moreover, Lim does not teach or suggest at least one external tie bar which is arranged on the corner of a "substrate." In Lim, it is apparent from FIG. 11 that the tie bars 530 are positioned on opposite sides of the chip 505 (see also column 6, lines 22-28).

For at least the reasons explained above, Lim does not anticipate or otherwise render obvious the Applicants' claimed invention. Therefore, independent claims 1 and 9, and their respective dependent claims, are patentable over Lim.

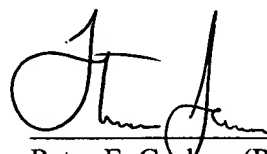
Regarding the rejection of independent claim 14, the Park reference was cited for teaching "the possibility of using at least one tie bar (122) that is attached to the chip pad (120)" (see Office Action, page 4, middle of page).

However, as shown in FIG. 5 of Park, the tie bar 122 is joined to chip attach pad 120 to provide mechanical stability to the chip attach pad 120 (see column 4, lines 23-26). Park does not teach or suggest linking the substrate to a supporting bar by at least one tie bar arranged on a corner of the substrate. Therefore, even if Park were somehow combined with Lin, it would not be possible to produce the Applicants' claimed invention.

Accordingly, independent claim 14 and its dependent claims are patentable over the combination of Lim in view of Park.

It is believed the application is in condition for immediate allowance, which action is earnestly solicited.

Respectfully submitted,



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